

**NOVEMBER 2005 SITE SURFACE REGRADING  
AND DRAINAGE IMPROVEMENTS  
NEAR CALCINE CAP, TRONOX INC.  
SODA SPRINGS, IDAHO FACILITY**



February 27, 2006

Prepared by:



GLOBAL ENVIRONMENTAL TECHNOLOGIES L.L.C.

SALT LAKE CITY, UTAH



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February 28, 2006

Mr. Boyd Schvaneveldt, Plant Manager  
Tronox  
P.O. Box 478  
Soda Springs, Idaho 83276

**RE: TRANSMITTAL: NOVEMBER 2005 SITE SURFACE REGRADING  
AND DRAINAGE IMPROVEMENTS NEAR CALCINE CAP, TRONOX  
SODA SPRINGS, IDAHO FACILITY**

Dear Boyd:

Please find transmitted the surface regrading report that documents the work performed at the Tronox Soda Springs, Idaho site in November 2005. Surface regrading and drainage improvements were completed adjacent to the calcine cap facility to mitigate standing surface water resulting from periodic cap runoff and snow melt into topographically lower areas. The report is also provided on disk and saved in Adobe Portable Document Format (.pdf) that can be viewed and printed using the commonly available Adobe Acrobat Reader™.

We appreciate the opportunity to work with you on this project. If you have any questions regarding this transmittal, please contact us.

Very truly yours,

**Global Environmental Technologies LLC**

John S. Brown, P.G.  
Principal/Owner

Attachments: Report and CD copy  
xc:

Neil Thompson—Region 10 EPA – 4 report copies, 4 CD copies  
Doug Tanner — IDEQ Pocatello – 1 report copy, 2 CD copies  
Dean Nygard — IDEQ Boise - 1 report copy, 2 CD copies  
Joe Derby (Tronox) –1 report copy, 1 CD copy  
John Hatmaker – (Tronox) –1 report copy, 1 CD copy  
Russ Jones – (Tronox) –1 report copy, 1 CD copy  
Toni Ellington – (Tronox) –1 report copy, 1 CD copy

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4	Final Survey of Surface Grade

## Introduction

The following report documents site drainage improvements made in November 2005 to the west and to the south of the capped calcine tailing. Selected photographs of surface grading and construction are presented as an attachment to this report. Maps attached to this report detail site conditions and work completed in 2005 and are based on survey datum collected under the direction of a licensed professional surveyor.

## History and Prior Improvements

### Calcine Tailing

The calcine tailing was impounded between 1978 and 1997 in an alternating series of diked ponds on the east side of the former vanadium plant site. Location of the calcine is shown on Figure 1. Calcine was produced during vanadium operations at the former Kerr-McGee Chemical LLC (now Tronox LLC.) facility in Soda Springs, Idaho. The dikes were constructed of borrowed native soils, predominantly from the north side and from the south side of the calcine impoundment. Excavation of the borrow areas resulted in topographic depressions on the north and south side of the calcine impoundment that were interior-draining low points which became snow-filled during winter months.

The impoundment was sited on native soils. These native soils include silts and silty clays with little variation within the soil profile. The silts and clays have vertical hydraulic conductivities that range from  $1 \times 10^{-5}$  to  $1 \times 10^{-4}$  centimeters per second (cm/sec) (GET, 2000). Soil depths range from near absent to greater than 20 feet. The bedrock consists of fractured and broken basalt. Basalts found beneath the soils are close to moderately fractured, and generally have larger vertical hydraulic conductivity than soils. Infiltration rates for basalts are unpredictable and unsaturated flow in basalt is best described as random, sporadic, and anisotropic.

### Calcine Capping Construction

In 2001, Kerr-McGee Chemical LLC regraded, sloped and capped the approximate 27-acre calcine impoundment. Closure of the calcine and construction of the calcine cap was completed under a CERCLA remedial action and documented in an as-built report (GET, 2002). Cap construction included placement of three feet of soil above a drainage net on an impermeable cover liner. The combined effects of cap construction between the ground surface depressions to the north and south of the calcine resulted in increased runoff to the north, west, and south of the facility. Runoff resulted in periodic standing water in these areas. During the first snowmelt event following capping, runoff created a 1.6 acre pond along the northern edge of the calcine cap.

### Drainage Improvements Completed in 2002

An infiltration basin was constructed on the north side of the calcine cap at the lowest topographic elevation immediately adjacent to the calcine cap fenceline. The project was completed in October 2002 and documented in the calcine cap infiltration basin as-built report, (GET, 2002). To date, no standing water has been noted in the depression north of the cap since the construction of this basin was completed.

## **2005 Site Drainage Improvements**

### General

Although standing water no longer occurs in the topographic depression on the north side of the cap, periodic standing water resulting from runoff to the west and south of the cap persisted through June 2005. Much of this standing water is occasionally present in an area south of the limestone pile, and at a second location immediately south of the cap on the site of the former roaster scrubber pond. The former pond was operational for approximately 22 years and was cleaned of scrubber sediments, filled to grade with compacted native soils, covered and seeded in the fall of 1997 as part of a

CERCLA remedial action (GET, 1998). The former scrubber pond is adjacent to the southeast corner of the capped calcine facility, as shown on Figure 1. Cover grade above the former scrubber pond was maintained at or near the elevation of the road since the cover fill was placed in 1998. However, localized soil settlement has resulted in low areas that periodically collect water from cap runoff. Snow accumulation south of the cap during winter months is substantial which results in increased surface water.

### Survey Control

Survey control was provided by Harper-Leavitt Engineers of Blackfoot, Idaho. Survey data provided by Harper-Leavitt are shown in Table 1. Survey data were used to project topographic contours and locate other site features shown on Figure 2. Survey data were used to project cut and fill balances for the drainage improvements and for the design of conveyance drainage trenches. Survey results indicated relatively flat grades west of the cap near the limestone pile where surface water runoff from the cap periodically accumulates. Surveys to the south of the cap indicated the lowest areas where settlement occurred and the dimensions of the areas that would require fills to provide positive grade.

An infiltration basin design was selected as the most efficient method for passive infiltration of cap runoff water. The selected design was similar to the basin on the north side of the cap. The location of the basin was selected near the lowest surveyed elevation south of the access road and south of the footprint of the former scrubber pond so that runoff could be directed to the lowest point in the area.

### Construction and Regrading

All excavation, site grading, trenching, and basin construction was completed by Craig's Backhoe Services of Soda Springs, Idaho between the dates of November 1 and November 12, 2005. Construction details of the basin are shown on Figure 3. Approximate locations of conveyance trench drains, the infiltration basin and the areas

of cuts and fills are shown on Figure 4. The cuts and fills were designed to reduce the amount of accumulated snow in the low areas and to allow for positive drainage towards the infiltration basin.

### Drainage Trench

Approximately 1,000 feet of drainage trench were excavated to convey surface water to the south toward the basin. Trenches were excavated using a John Deere 301D rubber tire backhoe. The trenches were designed to maintain a 1.5 degree or greater slope to the south to convey runoff from the southwest corner of the cap. Trench width was a nominal 2 foot width, with variable depth to maintain positive grade for drainage. Four-inch SDR-21 perforated PVC sewer drain pipe was placed in the drainage trenches following excavation, bedded and backfilled to above original grade using ¾-inch clean washed cinder materials. In areas where shallow trenching could not accommodate the drain pipe, trenches were left open and lined with cinders. The cinder and drain pipe in the trenches were wrapped using non-woven filter fabric. Positive grade was maintained to the south using survey laser level measurements.

### Infiltration Basin Construction

The infiltration basin was excavated in native soil (silt and clay) to bedrock at a depth of about 22 feet. Basin dimensions were about 80 by 80 feet at the ground surface with side slopes of approximately 1.5:1. Only native soils were encountered, and no soils exhibiting characteristics or odor of the former scrubber pond were encountered. Following excavation of the basin to bedrock, the bedrock surface was ripped by the contractor using a CAT D5 dozer and CAT 320CL extended boom trackhoe. A non-woven geotextile filter fabric was placed along the sides of the basin prior to adding filter sand. An 18 to 24-inch layer of silica sand was then placed within the basin on the geotextile filter fabric. Coarse limestone backfill was placed into the basin to within about one foot of the ground surface. Approximately 2,200 yards of limestone and sand

were placed within the basin as backfill. Following completion of the coarse limestone backfill, the contractor installed a sand filter blanket cover to approximately 9 inches above grade and placed a geotextile fabric layer within the sand to about 2 feet beyond the edge of the basin. The contractor then installed about one foot of coarse limestone cover as armoring material to bring the infiltration basin above surrounding grade. Construction details are shown on Figure 3.

### Site Surface Regrading

Soils that were excavated from the basin were used to provide fill in the area of the former scrubber pond just north and east of the basin. Two end-dump trucks were used to transport soils to fill areas. Compaction was completed using the CAT D5 dozer and the loaded dump trucks. To the east of the basin, low areas between the calcine cap fence and the barley field to the south were filled with native soils cut from the areas immediately south of the access road. Approximately 7,400 yards of soil were used to fill and regrade areas south of the cap. Fills ranged between 0.5 to about 7 feet. The site was graded such that drainage in the basin south of the cap sloped gently to the west toward the infiltration basin. Following completion of site surface grading, the area was revegetated using a mixture of intermediate and crested wheatgrass at the rate of about 15 pounds per acre.

### Site Surface Monitoring

Site surface conditions will be monitored for settlement and standing water conditions after snow melt. Conditions will be observed to check that the site drainage-ways are working as designed. Vegetation will be monitored to ensure that plant growth is established and that noxious weeds are controlled. Areas of erosion should be noted, and repaired if necessary.



## REFERENCES

GET, February 24, 2000, DRAFT REMEDIAL ACTION PROJECT IMPLEMENTATION PLAN FOR THE KERR-McGEE CHEMICAL CORPORATION SODA SPRINGS, IDAHO FACILITY

GET, February 18, 2002, DRAFT REMEDIAL ACTION COMPLETION REPORT CALCINE CAPPING KERR-McGEE CHEMICAL LLC SODA SPRINGS, IDAHO FACILITY

GET, October 20, 2002, CALCINE CAP INFILTRATION BASIN AS-BUILT REPORT, KERR-McGEE CHEMICAL LLC SODA SPRINGS, IDAHO FACILITY

**ATTACHMENT**

**SITE PHOTOGRAPHS  
NOVEMBER 1 THROUGH NOVEMBER 10, 2005**



LOOKING EAST-NORTHEAST – BREAKING GROUND ON INFILTRATION BASIN.  
CALCINE CAP BEHIND THE EQUIPMENT AND FENCE LINE IN BACKGROUND



LOOKING WEST-NORTHWEST ACROSS INFILTRATION BASIN EXCAVATION





LOOKING EAST- RAISING GRADE IN SETTLED AREA FORMER SCRUBBER POND



LOOKING EAST – MAKING CUTS TO PROVIDE FILL - WELL KM-2 IN FOREGROUND



LOOKING NORTHEAST ACROSS BASIN – PLACING SAND IN BASIN FOLLOWING  
PLACEMENT OF NONWOVEN GEOTEXTILE – BEDROCK EXPOSED IN BOTTOM OF  
EXCAVATION



LOOKING EAST-SOUTHEAST – PERFORMING SURVEY, SAND PLACEMENT





LOOKING EAST-NORTHEAST – COARSE LIMESTONE PLACEMENT ON SAND FILTER

LOOKING EAST ACROSS INFILTRATION BASIN - PLACING SEDIMENT BARRIER





LOOKING WEST – PRIOR TO FILL - CALCINE CAP ON RIGHT



LOOKING WEST – FOLLOWING PLACEMENT AND COMPACTION OF FILL AND PRIOR TO SMOOTHING NEAR SAME LOCATION AS TOP PHOTO - CALCINE CAP ON RIGHT

## **TABLES**



**TABLE 1**  
**SITE CONTROL SURVEY POINTS FOR SURFACE REGRADING**

<b>Survey Point</b>	<b>Easting Coordinate</b>	<b>Northing Coordinate</b>	<b>Ground Surface Elevation</b>	<b>Control Comment</b>
6000	816132	371781	6016.1	TOP
6001	816116	371748	5999.4	BTM
6002	816108	371745	5998.9	BTM
6003	816099	371743	5998.8	BTM
6004	816084	371742	5998.3	BTM
6005	816083	371755	6000.2	BTM
6006	816125	371786	6016.2	TOP
6007	816114	371791	6016.1	TOP
6008	816103	371794	6016.3	TOP
6009	816093	371795	6015.8	TOP
6010	816082	371794	6015.6	TOP
6011	816070	371790	6015.4	TOP
6012	816061	371783	6016.1	TOP
6013	816087	371747	5994.9	BTM
6014	816089	371755	5997.6	BTM
6015	816055	371773	6016.9	TOP
6016	816052	371761	6017.3	TOP
6017	816053	371747	6017.1	TOP
6018	816055	371734	6016.6	TOP
6019	816059	371721	6017	TOP
6020	816070	371716	6017.6	TOP
6021	816082	371714	6018.3	TOP
6022	816094	371712	6018.6	TOP
6023	816108	371712	6020.2	TOP
6024	816123	371713	6020.1	TOP
6025	816135	371715	6020.9	TOP
6026	816145	371723	6021.5	TOP
6027	816148	371733	6021.9	TOP
6028	816147	371747	6021.4	TOP
6029	816147	371757	6021.5	TOP
6030	816144	371764	6020.6	TOP
6031	816137	371771	6018.1	TOP
6032	816122	371771	6008.7	SLOPE
6033	816109	371777	6006.5	SLOPE
6034	816096	371777	6006.3	SLOPE
6035	816080	371774	6006.1	SLOPE
6036	816070	371764	6007	SLOPE
6037	816066	371754	6008.1	SLOPE
6038	816067	371745	6007.9	SLOPE
6039	816074	371736	6007.4	SLOPE
6040	816086	371731	6008.8	SLOPE
6041	816097	371729	6009.6	SLOPE
6042	816107	371728	6010.5	SLOPE
6043	816121	371729	6011.7	SLOPE
6044	816130	371735	6012.4	SLOPE
6045	816132	371744	6012.4	SLOPE
6046	816131	371753	6011.7	SLOPE
6047	816124	371754	6006	SLOPE
6048	816120	371748	6003.1	SLOPE
6049	816112	371739	6002.5	SLOPE
6050	816102	371737	6002.8	SLOPE
6051	816090	371738	6003.4	SLOPE
6052	816080	371741	6001.8	SLOPE
6053	816076	371749	6002.7	SLOPE
6054	816079	371757	6002.2	SLOPE

**TABLE 1**  
**SITE CONTROL SURVEY POINTS FOR SURFACE REGRADING**

<b>Survey Point</b>	<b>Easting Coordinate</b>	<b>Northing Coordinate</b>	<b>Ground Surface Elevation</b>	<b>Control Comment</b>
6055	816087	371764	6001.8	SLOPE
6056	816097	371767	6001.7	SLOPE
6057	816112	371766	6001.7	SLOPE
6058	816909	371837	6028.8	.NG BOUND
6059	816927	371808	6029	.NG BOUND
6060	816940	371778	6030.8	.NG BOUND
6061	816917	371762	6031.2	.NG BOUND
6062	816920	371740	6031	.NG BOUND
6063	816909	371780	6029.3	NG
6064	816898	371807	6027.6	NG
6065	816890	371832	6027.9	NG
6066	816884	371846	6028.2	NG BOUND
6067	816847	371854	6026.3	NG BOUND
6068	816850	371831	6026.1	NG
6069	816857	371803	6026.7	NG
6070	816864	371776	6027.8	NG
6071	816872	371748	6029.8	NG
6072	816876	371728	6030.5	NG BOUND
6073	816839	371720	6030.5	NG BOUND
6074	816835	371741	6029.2	NG
6075	816828	371771	6027.6	NG
6076	816822	371801	6026.1	NG
6077	816817	371831	6025.3	NG
6078	816813	371856	6026.3	NG BOUND
6079	816776	371851	6024.9	NG BOUND
6080	816779	371823	6024.5	NG
6081	816781	371794	6025.3	NG
6082	816786	371767	6027	NG
6083	816796	371739	6029	NG
6084	816802	371718	6030.4	NG BOUND
6085	816765	371717	6030.1	NG BOUND
6086	816761	371734	6029.2	NG
6087	816756	371763	6026.8	NG
6088	816751	371790	6025.4	NG
6089	816748	371819	6024.2	NG
6090	816744	371850	6024.1	NG BOUND
6091	816710	371847	6023.5	NG BOUND
6092	816712	371818	6023.2	NG
6093	816714	371786	6024.7	NG
6094	816712	371756	6026.8	NG
6095	816713	371718	6029	NG BOUND
6096	816678	371718	6028.8	NG BOUND
6097	816678	371749	6026.3	NG
6098	816674	371779	6024.5	NG
6099	816668	371808	6022.9	NG
6100	816663	371833	6022.6	NG
6101	816660	371846	6022.6	NG BOUND
6102	816627	371844	6022.1	NG BOUND
6103	816628	371819	6022	NG
6104	816629	371789	6022.9	NG
6105	816631	371760	6025.4	NG
6106	816633	371732	6027.5	NG
6107	816633	371720	6028.2	NG BOUND
6108	816599	371724	6028.5	NG BOUND
6109	816598	371749	6026.5	NG

**TABLE 1**  
**SITE CONTROL SURVEY POINTS FOR SURFACE REGRADING**

<b>Survey Point</b>	<b>Easting Coordinate</b>	<b>Northing Coordinate</b>	<b>Ground Surface Elevation</b>	<b>Control Comment</b>
6110	816598	371770	6024.1	NG
6111	816596	371795	6022.5	NG
6112	816593	371815	6022	NG
6113	816590	371832	6022.9	NG BOUND
6114	816567	371827	6027	NG BOUND
6115	816567	371813	6022.1	NG
6116	816566	371798	6022	NG
6117	816567	371787	6022.6	NG
6118	816566	371773	6025.5	NG
6119	816566	371765	6028.2	NG BOUND
6120	816557	371764	6028.5	NG BOUND
6121	816556	371773	6025.3	NG
6122	816555	371784	6022.8	NG
6123	816554	371799	6022	NG
6124	816553	371812	6022.4	NG
6125	816553	371821	6024.5	NG
6126	816553	371827	6026.9	NG BOUND
6127	816518	371834	6024.6	NG BOUND
6128	816519	371816	6021.9	NG
6129	816519	371786	6021.9	NG
6130	816519	371759	6024.9	NG
6131	816524	371715	6027.6	NG BOUND
6132	816492	371670	6027.7	NG BOUND
6133	816490	371701	6027.3	NG
6134	816486	371728	6025.9	NG
6135	816485	371758	6022.2	NG
6136	816482	371787	6020.9	NG
6137	816481	371817	6021	NG
6138	816481	371831	6020.9	NG BOUND
6139	816447	371825	6020.8	NG BOUND
6140	816447	371796	6020.4	NG
6141	816448	371767	6020.7	NG
6142	816447	371735	6022.1	NG
6143	816449	371707	6024.3	NG
6144	816451	371678	6027	NG
6145	816453	371641	6027.6	NG BOUND
6146	816421	371614	6027.6	NG BOUND
6147	371651	371638	6027	NG
6148	816407	371669	6024	NG
6149	816401	371699	6021.6	NG
6150	816395	371730	6020.3	NG
6151	816394	371761	6019.7	NG
6152	816394	371793	6019.7	NG
6153	816394	371823	6020.5	NG
6154	816391	371849	6021.2	NG BOUND
6155	816352	371931	6020.3	NG BOUND
6156	816353	371918	6020.3	NG
6157	816356	371890	6021.6	NG
6158	816360	371860	6021.2	NG
6159	816363	371833	6020.9	NG
6160	816367	371804	6019.8	NG
6161	816371	371774	6019.9	NG
6162	816373	371745	6019.7	NG
6163	816377	371716	6020.5	NG
6164	816381	371686	6021.8	NG

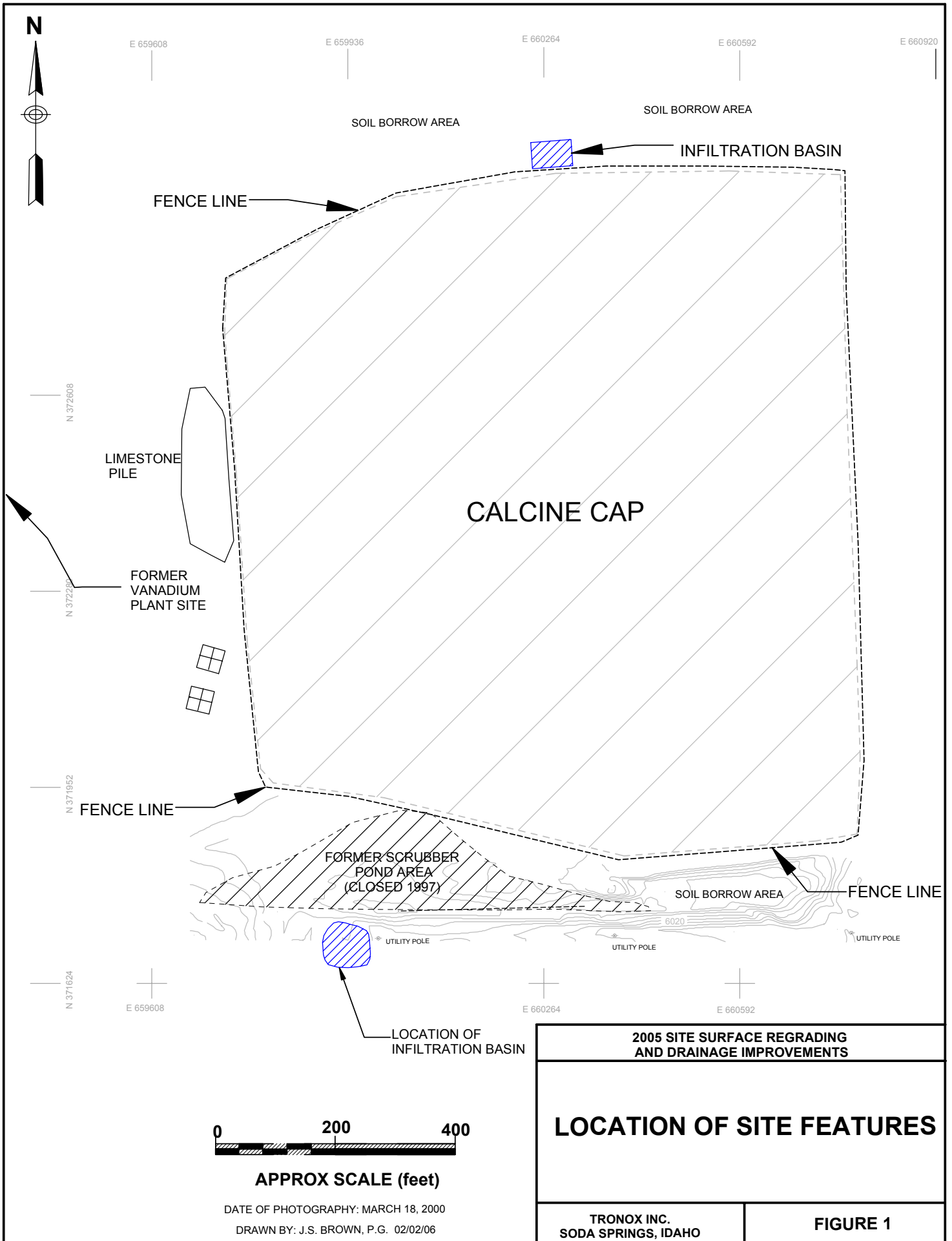
**TABLE 1**  
**SITE CONTROL SURVEY POINTS FOR SURFACE REGRADING**

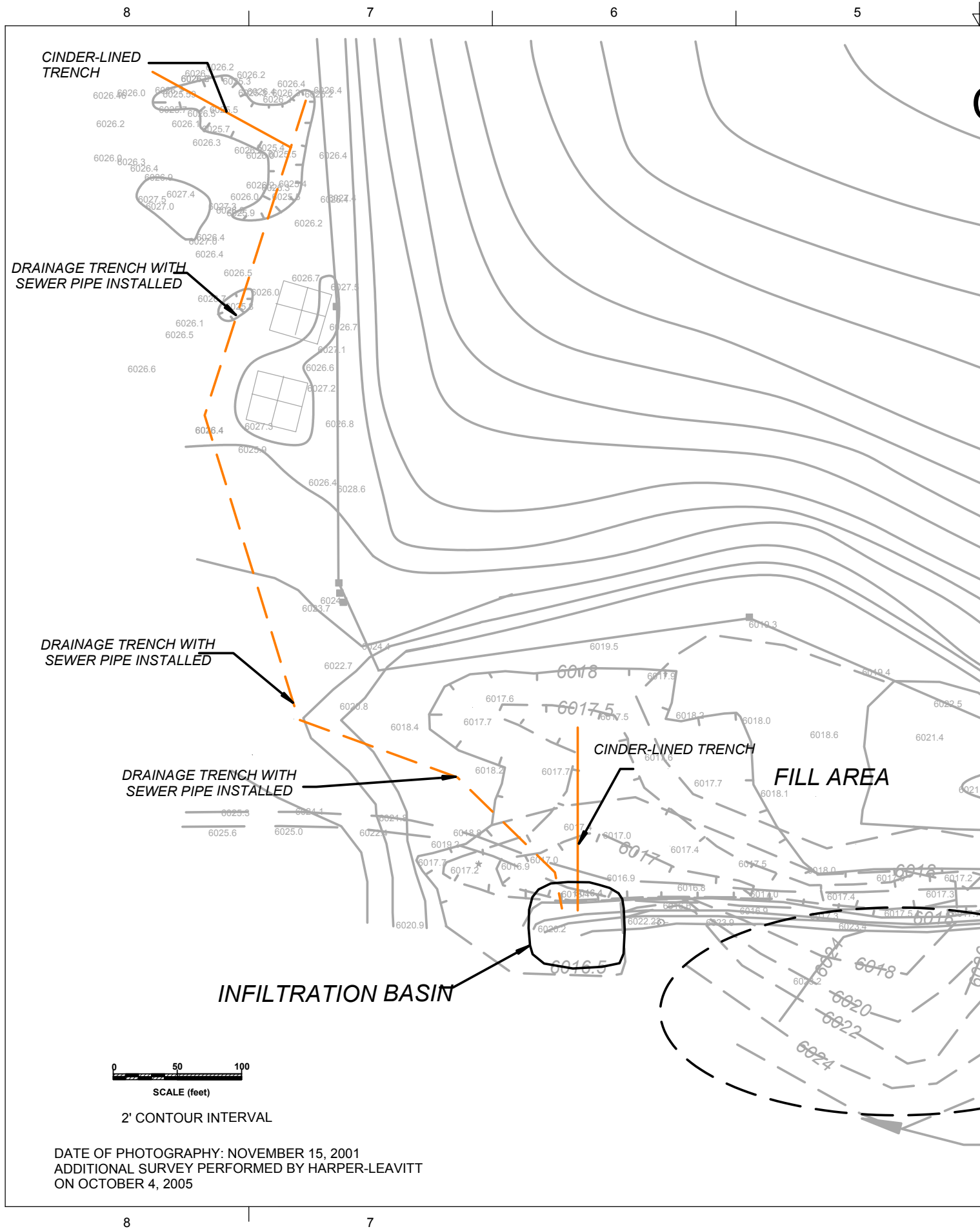
<b>Survey Point</b>	<b>Easting Coordinate</b>	<b>Northing Coordinate</b>	<b>Ground Surface Elevation</b>	<b>Control Comment</b>
6165	816385	371656	6023.5	NG
6166	816389	371628	6025.7	NG
6167	816393	371597	6027.1	NG BOUND
6168	816362	371592	6026.9	NG BOUND
6169	816356	371621	6025.5	NG
6170	816350	371651	6024.3	NG
6171	816344	371680	6021.9	NG
6172	816338	371712	6020.6	NG
6173	816332	371740	6019.7	NG
6174	816326	371771	6019.4	NG
6175	816322	371799	6019.4	NG
6176	816317	371829	6019.8	NG
6177	816312	371858	6020	NG
6178	816307	371887	6020.1	NG
6179	816303	371916	6019.6	NG
6180	816300	371949	6018.3	NG BOUND
6181	816265	371959	6018.3	NG BOUND
6182	816266	371941	6019.3	NG
6183	816269	371911	6019.8	NG
6184	816273	371880	6020	NG
6185	816276	371847	6019.8	NG
6186	816279	371819	6019.7	NG
6187	816281	371799	6018.5	NG
6188	816283	371773	6018.5	NG
6189	816284	371760	6019	NG
6190	816287	371731	6021.6	NG
6191	816290	371704	6023.4	NG BOUND
6192	816253	371732	6022.9	NG BOUND
6193	816251	371756	6020.3	NG
6194	816251	371770	6018.5	NG
6195	816250	371801	6017.8	NG
6196	816249	371825	6019.5	NG
6197	816248	371851	6019.6	NG
6198	816243	371883	6019.9	NG
6199	816237	371913	6019.7	NG
6200	816229	371935	6019.9	NG
6201	816223	371957	6018.1	NG BOUND
6202	816193	371960	6017.9	NG BOUND
6203	816197	371936	6019.9	NG
6204	816200	371908	6020.3	NG
6205	816201	371878	6020	NG
6206	816201	371878	6020	NG
6207	816202	371847	6019.6	NG
6208	816204	371815	6018.8	NG
6209	816204	371795	6017.5	NG
6210	816204	371777	6017.6	NG
6211	816204	371760	6021	NG
6212	816203	371749	6022.9	NG BOUND
6213	816176	371760	6023.7	NG BOUND
6214	816176	371773	6020	NG
6215	816175	371786	6017.1	NG
6216	816173	371814	6017.4	NG
6217	816171	371843	6018.4	NG
6218	816168	371874	6019.2	NG
6219	816166	371905	6019.9	NG

**TABLE 1**  
**SITE CONTROL SURVEY POINTS FOR SURFACE REGRADING**

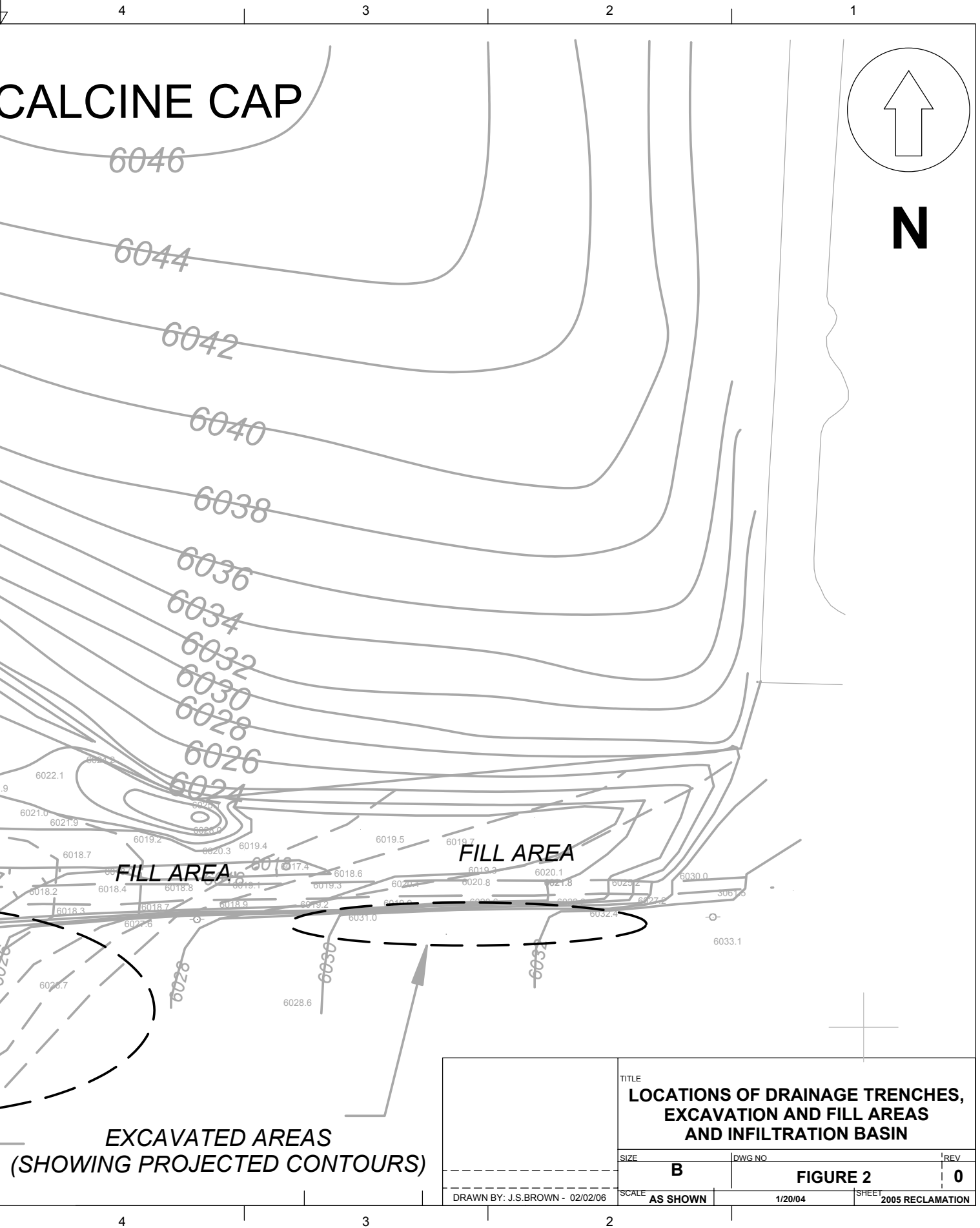
<b>Survey Point</b>	<b>Easting Coordinate</b>	<b>Northing Coordinate</b>	<b>Ground Surface Elevation</b>	<b>Control Comment</b>
6220	816164	371933	6020	NG
6221	816160	371959	6017.9	NG BOUND
6222	816132	371949	6018	NG BOUND
6223	816117	371933	6017.7	NG BOUND
6224	816113	371907	6017.7	NG BOUND
6225	816122	371876	6017.9	NG BOUND
6226	816129	371846	6017.3	NG BOUND
6227	816136	371820	6016.9	NG BOUND
6228	816146	371792	6016.6	NG BOUND
6229	816037	371935	6017.7	NG BOUND
6230	816013	371943	6018.1	NG BOUND
6231	815985	371943	6019	NG BOUND
6232	815958	371936	6019.7	NG BOUND
6233	815934	371934	6021.1	NG BOUND
6234	815938	371916	6019.9	NG BOUND
6235	815943	371901	6019.6	NG BOUND
6236	815964	371903	6018.8	NG BOUND
6237	815962	371922	6019.4	NG
6238	815989	371901	6018.2	NG BOUND
6239	815989	371911	6018.6	NG BOUND
6240	815989	371923	6018.5	NG
6241	816003	371912	6018.1	NG BOUND

## FIGURES

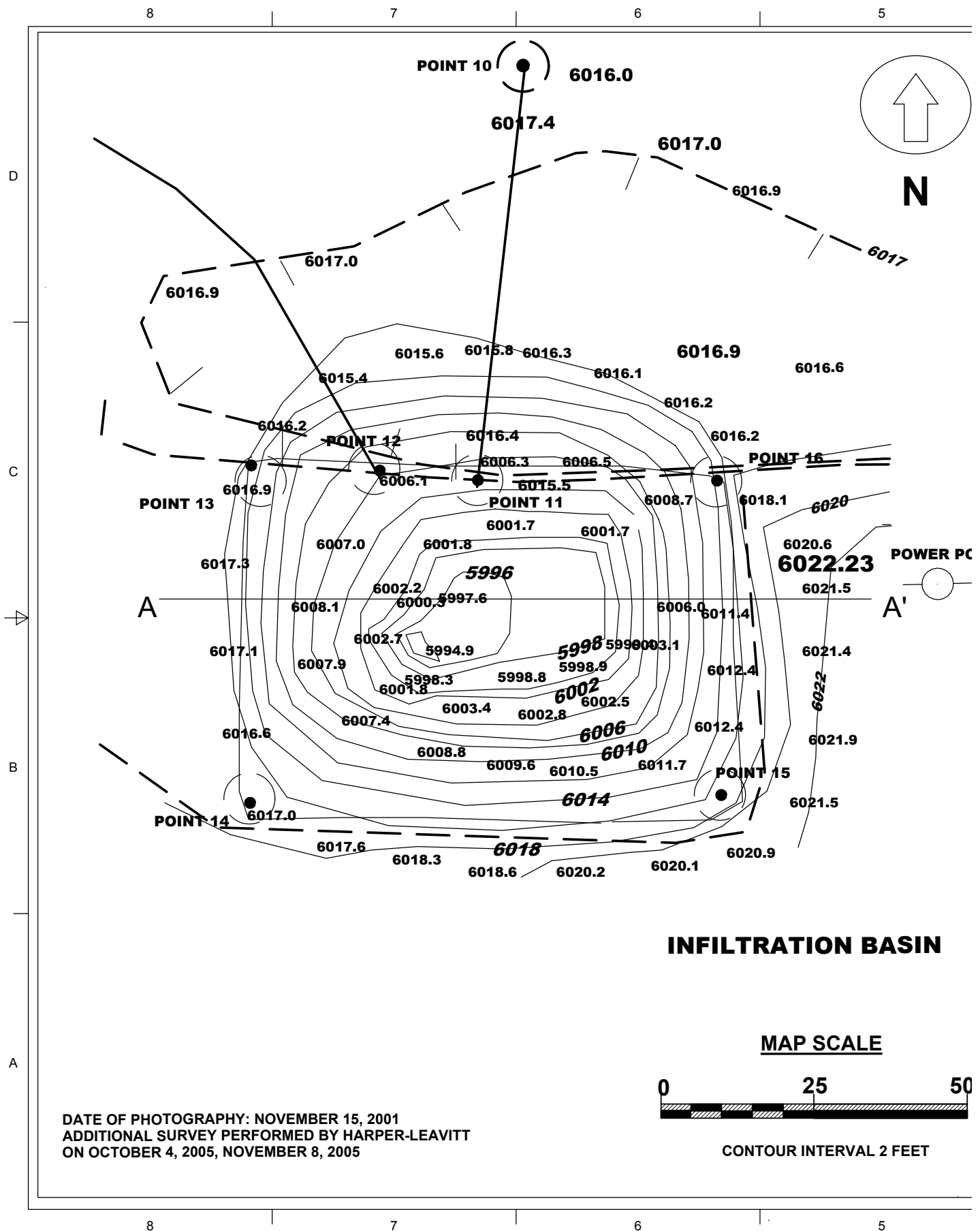


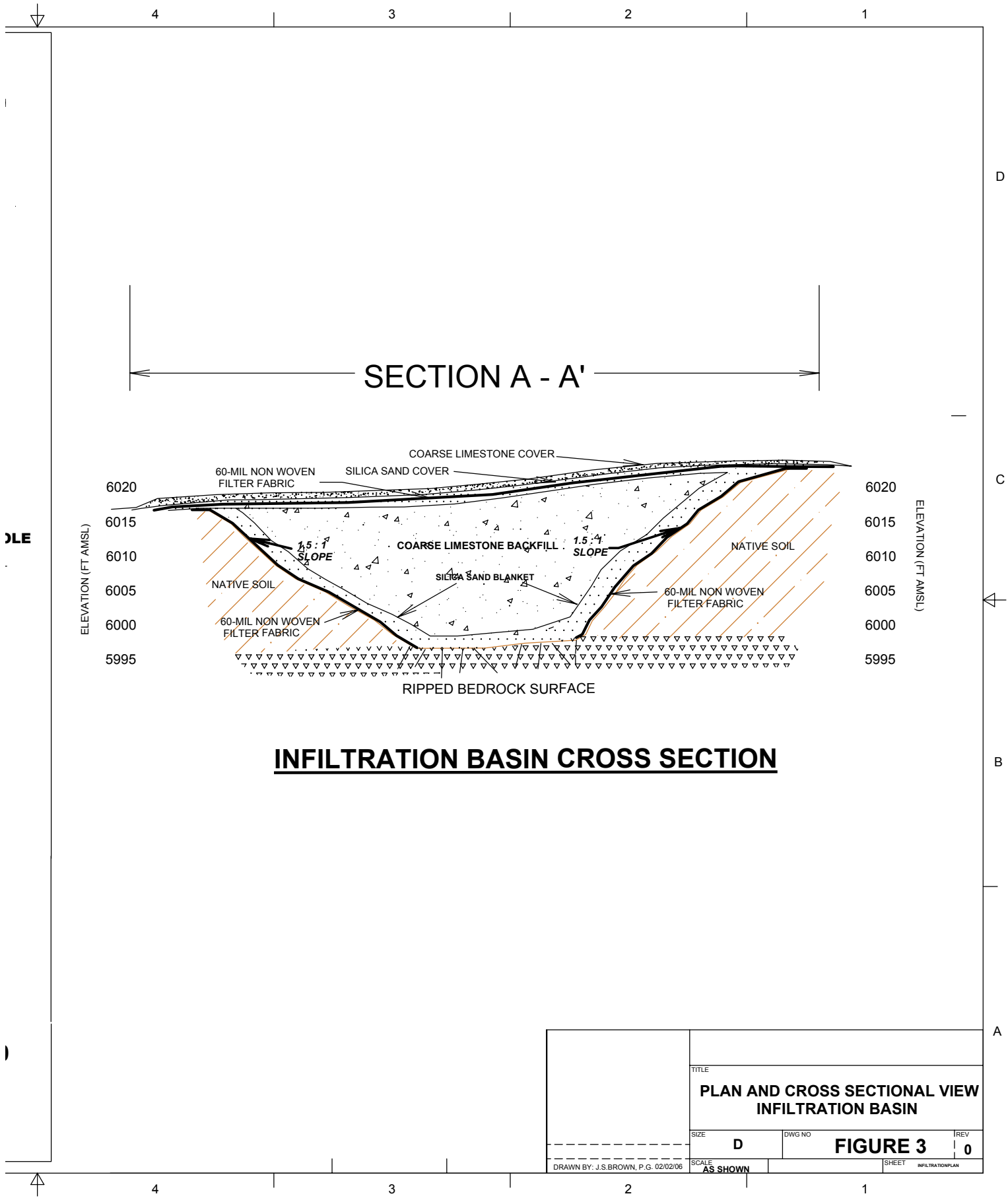






TITLE LOCATIONS OF DRAINAGE TRENCHES, EXCAVATION AND FILL AREAS AND INFILTRATION BASIN			
SIZE B	DWG NO FIGURE 2	REV 0	
DRAWN BY: J.S.BROWN - 02/02/06	SCALE AS SHOWN	1/20/04	SHEET 2005 RECLAMATION





**INFILTRATION BASIN CROSS SECTION**

TITLE			
PLAN AND CROSS SECTIONAL VIEW INFILTRATION BASIN			
SIZE	D	DWG NO	REV
		FIGURE 3	0
DRAWN BY: J.S.BROWN, P.G. 02/02/06	SCALE	SHEET	
	AS SHOWN	INFILTRATION PLAN	

8

7

6

5

D

C

B

A

FENCE LINE

INFILTRATION BASIN

DATE OF PHOTOGRAPHY: NOVEMBER 15, 2001  
ADDITIONAL SURVEY PERFORMED BY HARPER-LEAVITT  
ON OCTOBER 4, 2005, NOVEMBER 8, 2005



